

Second Joint International Conference on  
New Phenomena in Mesoscopic Systems and  
Surfaces and Interfaces of Mesoscopic Devices

November 27—December 2, 2005  
Ritz Carlton Kapalua, Maui, Hawaii

**Sunday, November 27** *Arrival*

3:00 p.m. Registration

6:00 Reception

**Monday, November 28**

8:30 a.m. **Plenary Session**  
Chair: *Chihiro Hamaguchi*

8:30 General Welcome, *Stephen Goodnick and Yoshinobu Aoyagi*

8:45 The life and times of Gottfried Landwehr  
*Klaus von Klitzing*

9:15 **Quantum Dots and Point Contacts**  
Chair: *Tsuneya Ando*

9:15 (Invited) G. Bauer, *University of Linz*, “Realization and characterization of two- and three-dimensionally ordered quantum dots”

9:55 R. Brunner, R. Meisels, F. Kuchar, J. P. Bird, R. Akis, and D. K. Ferry, *Montanuniversität Leoben*, “Classical and quantum mechanical behavior in open quantum dot arrays”

10:15 *Coffee Break*

10:40 C. J. Meining, V. R. Whiteside, A. Petrou, B. D. McCombe, A. B. Dzyubenko, J. G. Tischler, A. S. Bracker, D. Gammon, M. Byszewski, and M. Potemski, *University at Buffalo*, “Charged magneto-excitons in weakly confining quantum dots: Magneto-PL and optically detected resonance spectroscopy”

11:00 M. Elhassan, J. P. Bird, R. Akis, D. K. Ferry, T. Ida, and K. Ishibashi, *Arizona State University*, “Dephasing due to coupling to the external environment in open quantum-dot arrays”

11:20 Gerhard Klimeck, M. Korkusinski, H. Xu, S. Lee, S. Goasguen, and F. Saied, *Purdue University*, “Atomistic simulations of long-range strain and spatial asymmetry effects in single and coupled quantum dots”

11:40 N. Aoki, A. Burke, C. R. da Cunha, R. Akis, D. K. Ferry, and Y. Ochiai, *Arizona State University*, “Study of quantum point contact via low temperature scanning gate microscopy”

- 12:00 L. P. Rokhinson, L. N. Pfeiffer, and K. W. West, *Purdue University*, “Spontaneous spin polarization in quantum point contacts”
- 12:20 *Lunch and afternoon discussions*
- 7:00 p.m. **Quantum Information and Quantum Electronics**  
Chair: *Yoshinobu Aoyagi*
- 7:00 (Invited) H. Yamaguchi, *NTT Basic Research Laboratory*, “Micro/Nanomechanical quantum electron transport”
- 7:40 A. Gärtner, A. W. Holleitner, J. P. Kotthaus, M. Bichler, and D. Schuh, CENS and LMU München, “Exciton dynamics in voltage-tunable mesoscopic landscapes”
- 8:00 (Invited) Amir Yacoby, *Weizmann Institute*, “Spin echo and Rabi oscillations in GaAs quantum dots”
- 8:40 Q. Zhang, R. Ruskov, and A. N. Korotkov, *University of California Riverside*, “Quantum feedback of solid-state qubits”
- 9:00 R. H. Blick, F. W. Bell, A. Wixforth, W. Wegscheider, D. Schuh, and M. Bichler, *University of Wisconsin*, “Detection of acoustic Rabi oscillations in a quantum-electromechanical resonator”

## Tuesday, November 29

- 8:45 a.m. **Quantum Hall Effect**  
Chair: *Friedl Kuchar*
- 8:45 (Invited) K. von Klitzing, *MPI Stuttgart*, “Magnetotransport in coupled 2DEGs”
- 9:25 (Invited) Y. Kawano and T. Okamoto, *University of Tokyo*, “Spatial imaging of noise voltages by a quantum Hall scanning electrometer”
- 10:05 *Coffee Break*
- 10:30 **Devices**  
Chair: *Koji Ishibashi*
- 10:30 (Invited) Y. Ono, *NTT Basic Research Laboratory*, “Single-electron manipulation in silicon: Towards single-dopant electronics”
- 11:10 J. R. Tucker, T.-C. Shen, and S. J. Robinson, *University of Illinois*, “Nanoscale Si field effect transistors with P  $\delta$ -layer source/drain”
- 11:30 J. R. Barker, J. R. Watling, and G. Ferrari, *University of Glasgow*, “SO phonon scattering rates at the Si-HfO<sub>2</sub> interface in Si MOSFETs”

- 11:50 G. Roy, F. Adamu-Lema, A. R. Brown, S. Roy, and A. Asenov, *Glasgow University*, “Intrinsic parameter fluctuations in conventional MOSFETs until the end of the ITRS: A statistical simulation study”
- 12:10 K. Sawano, N. Usami, N. Nakagawa, and Y. Shiraki, *Musashi Institute of Technology*, “Strain field fluctuation in SiGe buffer layers and its reduction by ion implantation technique”
- 12:30 *Lunch and afternoon discussions*

7:00 p.m. **Poster Session 1**

- P01 S. Marcinkevičius and J. Siegert, *Swedish Royal Institute of Technology*, “Carrier dynamics in modulation doped InAs quantum dots”
- P02 B. Naser, J. Heeren, D. K. Ferry, and J. P. Bird, *Arizona State University*, “Time-resolved conductance of quantum point contacts”
- P03 J. T. Seo, S. M. Ma, Q. Yang, D. Pugh-Thomas, R. Battle, H. Brown, B. Tabibi, and S. S. Jung, *Hampton University*, “Large resonant third-order optical nonlinearity of CdSe nanocrystal quantum dots”
- P04 I. Turkevych, K. Takehana, T. Takamasu, T. Yamaguchi, and G. Kido, *National Institute for Material Science*, “Antidot lattices in GaAs/AlGaAs heterostructure”
- P05 M. Saito, Y. Ogawa, F. Minami, K. Yamagiwa, and N. Koguchi, *Tokyo Institute of Technology*, “Multi-electronic structures in GaAs quantum dots”
- P06 W. Hanke, A. Flezar, M. Potthoff, *University of Würzburg*, “A new approach (LDA+SFT) to materials with simultaneously weak and strong electronic correlations”
- P07 N. Kobayashi, T. Ozaki, and K. Hirose, *AIST*, “First-principles calculation of ballistic transport in nanoscale systems using Green’s function method with localized basis set”
- P08 A. V. Chaplik and R. Z. Vitlina, *Institute of Semiconductor Physics*, “New branch of intersubband plasmons in a nonequilibrium bilayer system”
- P09 G. P. Berman, A. R. Bishop, B. M. Chernobrod, M. E. Hawley, and G. W. Brown, *Los Alamos National Laboratory*, “Novel opto-nano-mechanical photodetector for improving the sensitivity of LIDAR and local optical sensors”
- P10 T. V. Shahbazyan, J. Dai, and M. E. Raikh, *Jackson State University*, “Two-plasmon intersubband absorption in quantum wells”
- P11 V. V. Mitin and N. Z. Vagidov, *University at Buffalo*, “Ultra-thin Si films—A viable material for terahertz oscillators”

- P12 Q. Yang, J. T. Seo, S. Creekmore, G. Tan, S. M. Ma, B. Tabibi, H. Wang, and S. S. Jung, *Hampton University*, “Z-scan and four-wave mixing characterization of semiconductor cadmium chalcogenide nanomaterials”
- P13 J. Bean, J. McRaven, B. Rakos, G. Bernstein, P. Fay, and W. Porod, *Notre Dame University*, “Antenna-coupled metal-oxide-metal diodes for terahertz detection”
- P14 K. Ohmori, T. Kitada, S. Himomura, and S. Hiyamizu, *Osaka University*, “Much improved pulse oscillation of self-organized  $\text{In}_{0.53}\text{Ga}_{0.47}\text{As}$  quantum wire lasers grown on (775)B InP substrates by MBE”
- P15 L. Wang and S. M. Phillips, *Arizona State University*, “Nano-resonators for RF communications applications”
- P16 T. Usuki, Y. Sakuma, S. Hirose, K. Takemoto, N. Yokoyama, T. Miyazawa, M. Takatsu, and Y. Arakawa, *University of Tokyo*, “Single photon generator in optical telecom wavelength”
- P17 G. P. Berman, A. R. Bishop, B. M. Chernobrod, M. E. Hawley, and G. W. Brown, *Los Alamos National Laboratory*, “Measurement of single electron and nuclear spin states based on optically detected magnetic resonance”
- P18 A. Ramamoorthy and J. P. Bird, *Arizona State University*, “Investigation of quantum-NOT operation in a coupled-quantum-wire qubit”
- P19 T. Nakamura, Y. Abe, S. Kasai, H. Hasegawa, and T. Hashizume, *Hokkaido University*, “Properties of a GaAs single electron path switching node device using a single quantum dot for hexagonal BDD quantum circuits”
- P20 M. Prada, A. Sayeed, and R. H. Blick, *University of Wisconsin*, “Qubit encoding in quantum dot spin-based devices”
- P21 Y. Shimoda, T. Nakajima, and A. Sawada, *Tohoku University*, “Theoretical phase diagram of bilayer  $\nu = 1$  quantum Hall systems”
- P22 A. Martinez, J. R. Barker, A. Svizhenko, M. P. Anantram, A. R. Brown, B. Biegel, and A. Asenov, *Glasgow University*, “The impact of unintentional discrete charges in a nominally undoped channel for a thin body double gate MOSFET: Classical to full quantum simulation”
- P23 D. Mamaluy, H. Khan, and D. Vasileska, *Arizona State University*, “3D quantum transport simulator for next generation devices”
- P24 K. Kalna, A. Asenov, and M. Passlack, *Glasgow University*, “Monte Carlo simulation of implant free InGaAs MOSFET”
- P25 T. Sugaya, T. Yamane, S. Hori, K. Komori, and K. Yonei, *AIST*, “Velocity modulation transistors with InGaAs dual channel structures”
- P26 J. R. Barker and J. R. Watling, *Glasgow University*, “Atomistic scattering close to an interface”

- P27 M. Arifuzzaman and D. Vasileska, *Arizona State University*, “Investigation of self-heating effects in individual SOI devices and due to device-device interactions”
- P28 K. Furuya, N. Machida, R. Nakagawa, I. Kashima, M. Ishida, and Y. Miyamoto, *Tokyo Institute of Technology*, “MC simulation and fabrication of ultrafast transistor using ballistic electron in intrinsic semiconductor”

### Wednesday, November 30

- 8:45 a.m. **Spin Systems**  
Chair: *Robert Blick*
- 8:45 (Invited) K. Ensslin, *ETH Zurich*, “Spins in quantum dots and their manipulation”
- 9:25 S. Sasaki, S. Kang, K. Kitagawa, M. Yamaguchi, S. Miyashita, T. Maruyama, H. Tamura, T. Akazaki, Y. Hirayama, and H. Takayanagi, *NTT Basic Research Laboratory*, “Spin correlation in a double quantum dot—quantum wire coupled system”
- 9:45 (Invited) K. Ploog, *Paul Drude Institute*, “New phenomena in the ferromagnetic III-V semiconductors (Ga,Mn)As and (Ga,Gd)N”
- 10:25 *Coffee break*
- 10:50 B. T. Jonker, T. J. Zega, A. T. Hanbicki, G. Kioseoglou, C. H. Li, O. M. J. van 't Erve, R. M. Stroud, and S. C. Erwin, *Naval Research Laboratory*, “The effect of interface atomic structure and annealing on spin injection in Fe/AlGaAs Schottky spin-LEDs”
- 11:10 J. Smoliner, D. Rakoczy, R. Heer, and H. Brückl, *TU-Wien*, “Ballistic electron transport in spin valve transistors and cross-sectional geometries”
- 11:30 (Invited) S. Parkin, *IBM*, “Giant tunneling spin polarization in MgO based magnetic tunnel junctions and injectors”
- 12:10 L. Ji, A. Imre, A. Orlov, G. H. Bernstein, and W. Porod, *Notre Dame University*, “Domain wall trapping in magnetic wires by nanomagnets”
- 12:30 T. Kita, M. Kohda, Y. Ohno, and H. Ohno, *Tohoku University*, “Integrated resonant tunnel diode/(Ga,Mn)As/n<sup>+</sup>-GaAs ferromagnetic Zener diode”
- 12:50 *Lunch and afternoon discussions*
- 6:30 p.m. *Banquet Reception*
- 7:30 *Banquet*

## Thursday, December 1

### 8:45 a.m. **Carbon Nanotubes and Molecular Electronics I**

Chair: *David Janes*

8:45 (Invited) M. Aono, *National Institute for Materials*, “Novel Atomic and Molecular Switches”

9:25 K. Tsukagoshi, J. Tanabe, K. Shigeto, K. Yanagisawa, and Y. Aoyagi, *RIKEN*, “Nano-scale interface controls for organic electronics”

9:45 K. Ogawa, A. Ikegami, H. Tsuji, N. Aoki, Y. Ochiai, and J. P. Bird, *Chiba University*, “Study of the electrical properties of field-effect transistors based on C<sub>60</sub> nano-whiskers”

10:05 Y. Ohno, S. Kishimoto, and T. Mizutani, *Nagoya University*, “Carrier transport properties in single-walled carbon nanotubes studied by photoluminescence spectroscopy”

10:25 *Coffee break*

### 10:45 **Quantum Wires**

Chair: *Mark Hersam*

10:45 (Invited) D. van der Weide, *University of Wisconsin*, “Nonlinear transmission in mesoscopic wires”

11:25 T. Morimoto, M. Hemmi, R. Naito, J.-S. Park, M. Kida, N. Aoki, Y. Ochiai, and J. P. Bird, *Chiba University*, “Novel phenomena in one-dimensional transport in long quantum wires”

11:45 R. Akis, M. J. Gilbert, and D. K. Ferry, *Arizona State University*, “Fully quantum mechanical simulations of gated silicon quantum wire structures: Investigating the effects of changing wire cross-section on transport”

12:05 D. B. Janes, S. Ju, K. Lee, M.-H. Yoon, A. Facchetti, and T. J. Marks, *Purdue University*, “High mobility ZnO nanowire field-effect transistors enabled by self-assembled organic gate nanodielectrics”

12:25 *Lunch and afternoon discussions*

### 7:00 p.m. **Poster Session**

P29 M. Ishikawa, H. Nii, and T. Nakayama, *Yokogawa Electric Corporation*, “First-principles study of dielectric properties of nano-scale films”

P30 T. Maemoto, M. Koyama, M. Furukawa, H. Takahashi, S. Sasa, and M. Inoue, *Osaka Institute of Technology*, “Electron transport in InAs/AlGaSb ballistic rectifiers”

P31 V. Rizhii, A. Satou, I. Khmyrova, M. Ryzhii, T. Otsuji, V. Mitin, and M. S. Shur, *University of Aizu*, “Terahertz plasma instability in tunneling-injection transit-time lateral Schottky diode”

- P32 T. Nakayama, S. Itaya, and Daika Murayama, *Chiba University*, “Nano-scale view of atom intermixing at metal/semiconductor interfaces”
- P33 N. Seoane, A. J. Garcia-Loureiro, K. Kalna, and A. Asenov, *Glasgow University*, “Indium content fluctuations in the channel of a 120 nm PHEMT”
- P34 M. J. Gilbert and D. K. Ferry, *Arizona State University*, “Phonon limited performance of III-V nanowire transistors”
- P35 S. Kasai and H. Hasegawa, *Hokkaido University*, “Feasibility study of a digital nanoprocessor utilizing GaAs quantum wire switches and hexagonal BDD quantum circuit architecture”
- P36 T. Suzuki and N. Mori, *Osaka University*, “Periodic magnetoresistance oscillations in side-gated quantum wires”
- P37 M. Yun, *University of Pittsburgh*, “Single nanowire sensors for the detection of gases and DNA”
- P38 F. Wakaya, Y. Tsukatani, N. Yamasaki, K. Murakami, S. Abo, and M. Takai, *Osaka University*, “Transport properties of beam-induced-deposited Pt nanowires”
- P39 E. Ramayya, S. M. Goodnick, and D. Vasileska, *Arizona State University*, “Electron transport in Si nanowires”
- P40 H. Tamura, M. Yamaguchi, S. Nomura, T. Akazaki, H. Takayanagi, P. Mohan, J. Motohisa, and T. Fukui, *NTT Basic Research Laboratory*, “Magneto-optical properties of electron-hole states in GaAs quantum wires”
- P41 M. E. Flatté, *University of Iowa*, “Spontaneous formation of spin polarized pulses of current in mesoscopic systems”
- P42 O. Olendski and T. V. Shahbazyan, *Jackson State University*, “Anisotropy of exciton spectrum and spin-orbit interactions in quantum wells in tilted magnetic field”
- P43 M. Pourfath, H. Kosina, and S. Selberherr, *TU Wien*, “Rigorous modeling of carbon nanotube field effect transistors”
- P44 K. Maejima, O. Suzuki, T. Uchida, N. Aoki, M. Tachibana, and Y. Ochiai, *Chiba University*, “Raman and transport studies in multi-walled carbon nanotubes”
- P45 B. P. Zhang, K. Shimazaki, T. Shiokawa, M. Suzuki, and K. Ishibashi, *RIKEN*, “Raman and photoluminescence measurements on suspended single-wall carbon nanotubes”
- P46 J. T. Seo, S. M. Ma, Q. Yang, D. Pugh-Thomas, R. Battle, M. Tabibi, H. Brown, B. Tabibi, and S. S. Jung, *Hampton University*, “Third-order

- optical nonlinearities of singlewall carbon nanotubes for optical power limiting application”
- P47 T. K. Sasaki, A. Ikegami, M. Mochizuki, N. Aoki, and Y. Ochiai, *Chiba University*, “MWNT electrodes for bio-nano-electronic applications”
- P48 Y. Bin, A. Koganemaru, and M. Matsuo, *Nara Women’s University*, “Effect of the high thermal conductivity of carbon nanotubes under carbonization of polymer nanocomposites”
- P49 S. Uryu and T. Ando, *Tokyo Institute of Technology*, “Negligible inter-wall interaction in multi-wall carbon nanotubes”
- P50 K. Tsubaki, Y. Nakajima, T. Hanajiro, and H. Yamaguchi, *Toyo University*, “Proposal of carbon nanotube inductors”
- P51 J. T. Seo, Q. Yang, S. M. Ma, D. Pugh-Thomas, R. Battle, H. Brown, B. Tabibi, S.-S. Sun, C. Zhang, and S. S. Jung, *Hampton University*, “Nonlinear optical properties of nanostructured supramolecular organic semiconductor”
- P52 Y. Ohno, K. Narumi, K. Maehashi, K. Inoue, and K. Matsumoto, *Osaka University*, “Magnetoresistance in single-walled carbon nanotubes with different ferromagnetic electrodes”
- P53 G. Kido, T. Kuroda, K. Takazawa, N. Morii, and H. Morii, *National Institute for Material Science*, “Time response of photocurrent in an oriented DNA membrane”
- P54 K. Hirose, and N. Kobayashi, *NEC Corporation*, “Ab initio calculations of contact effects on electron transport through single molecules by the RTM/NEGF method”

## Friday, December 2

- 8:45 a.m. **Carbon Nanotubes and Molecular Electronics II**  
Chair: *John Barker*
- 8:45 (Invited) V. Sazonova, *Cornell University*, “A tunable carbon nanotube oscillator”
- 9:25 S. Moriyama, T. Fuse, M. Suzuki, T. Yamaguchi, and K. Ishibashi, *RIKEN*, “Electrical pulse-excited transport measurement of carbon nanotube quantum dots in magnetic fields”
- 9:45 T. Ando, *Tokyo Institute of Technology*, “Aharonov-Bohm effects on bright and dark excitons in carbon nanotubes”
- 10:05 *Coffee break*
- 10:30 (Invited) Y.-M. Lin, *IBM*, “Carbon nanotube electronics”

- 11:10 M. Shimizu, S. Moriyama, M. Suzuki, Y. Homma, and K. Ishibashi, *RIKEN*, “Statistical characterization of dispersed single-wall carbon nanotube quantum dots”
- 11:30 S. J. Wilk, S. Aboud, L. Petrossian, M. Goryll, J. M. Tang, R. S. Eisenberg, M. Saraniti, S. M. Goodnick, and T. J. Thornton, *Arizona State University*, “Ion channel conductance measurements on a silicon-based platform”
- 11:50 (Invited) M. Hersam, *Northwestern University*, “Molecular-scale patterning and characterization of organic structures on silicon”
- 12:30 G. Speyer, R. Akis, and D. K. Ferry, *Arizona State University*, “Using local orbitals in DFT to examine oligothiophene conductance anomalies”
- 12:50 **Conference Closing Comments**, *Steve Goodnick*